

What is claimed is:

1. A method for performing a macro financial risk analysis, comprising the steps of:

storing financial data, including assets and debt, on one or more preselected economic

entities in an economy;

storing data on at least one of: macroeconomic parameters, time horizon, or macro financial

risk parameters;

calculating a value of interlinked aggregate derivatives for at least one of said preselected

economic entities to generate a characterization of an economic value associated

with at least one of an implicit economic right, to exchange a portion of said assets

or portion of said debt, or an implicit economic obligation, to exchange a portion of

said assets or portion of said debt, in a specific time period; and

generating an output representing said economic value.

2. The method of claim 1, wherein the steps of storing are performed using one or more

computer memories, and wherein the steps of calculating and generating are performed by

one or more processors operatively associated with the one or more computer memories.

3. The method of claim 1, wherein:

said preselected economic entities include one or more of: individuals, firm, group of firms,

financial institution, group of financial institutions, governments, monetary

authorities, or international financial institutions; and

said inputs on macroeconomic parameters and macro financial risk parameters are variable.

4. The method of claim 3 further comprising the steps of:

selecting an alternative asset value and probability distribution of said alternative asset

value; and

executing calculation of the interlinked aggregate derivative asset exchange option thus

determining the value of said exchange of asset value for said alternative asset value.

[illegible]

executing calculation of the interlinked aggregate derivative fiscal exchange option thus

**6. The method of claim 4 further comprising the steps of:**

executing calculation of the interlinked aggregate derivative monetary authorities asset

**7. The method of claim 3 further comprising the steps of:**

calculating at least one interlinked aggregate derivative near term debt exchange option

**8. The method of claim 7 further comprising the steps of:**

calculating at least one interlinked aggregate derivative near term debt exchange option thus

**9. The method of claim 7 further comprising the steps of:**

calculating at least one interlinked aggregate derivative put option thus determining the economic value of the implicit economic right of exchanging a portion of assets of a firm or a group of firms, for a portion of debt obligations, to said firm or said group of firms and implicit economic cost of said interlinked aggregate derivative put option to the holder of debt of said firm or said group of firms.

**10.** The method of claim 7 further comprising the steps of:

calculating a portion of debt or deposits that will become the obligation of said governments or said monetary authorities;

calculating a share of assets transferred to holders of debt in the event that said debt or said deposits is not or cannot be paid by said financial institutions or said groups of financial institutions; and

calculating at least one interlinked aggregate derivative financial sector put option thus determining the economic value of the implicit economic right of transferring a portion of assets of the financial institution or the group of financial institutions to the governments or the monetary authorities in exchange for cancellation of the obligation to pay a portion of said debt or said deposits.

**11.** The method of claim 3 further comprising the steps of:

calculating at least one interlinked aggregate derivative call option thus determining the economic value of retaining assets and paying debt of said firm, group of firms, financial institution, or group of financial institutions.

**12.** The method of claim 3 further comprising the steps of:

calculating at least one implicit payment which is paid to one preselected economic entity having at least one interlinked aggregate derivative credit event payment that is the implicit obligation of and paid by another preselected economic entity; and

calculation of the value of the interlinked aggregate derivative credit event payment.

**13.** A method executed by a computer with readable memory under the control of a program, said method comprising the steps of:

storing financial and economic data for one or more economic entities, wherein the

economic entities include one or more of the following, financial institutions,

governments, monetary authorities, each entity having a plurality of associated assets;

calculating at least one of: a value of assets associated with the one or more economic

entities and a probability distribution of assets of the one or more economic entities;

calculating a default barrier value for each of said entities;

subtracting the default barrier value from a value of said assets;

calculating a distance to default at a time horizon, and an expected probability of said assets

being equal to or less than said default barrier at said time horizon, so as to measure

risk associated with default or events occurring when said assets are less than or

equal to said default barriers; and

generating a report and graph associated with said calculations.

**14.** The method of claim 13, wherein the economic entities include one or more entities

within a financial sector, one or more government entities, one or more monetary

authorities, or central bank.

**15.** The method of claim 13, wherein the default barrier is variable.

**16.** The method of claim 15, wherein the default barrier varies according to one or more of

the following factors: exchange rates, interest rates in the country, interest rates in

other countries, the share of near term debt exchanged for long term debt.

**17.** The method of claim 13, wherein the time horizon is variable.

**18.** The method of claim 3 further comprising the steps of:

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calculating of the combined asset value by adding said assets to said interlinked aggregate derivatives that have the characteristics of an asset, of said preselected entities;  
calculating of probability distribution of said combined asset value of said preselected entities;  
calculating the combined value of variable default barrier by adding said default barrier to interlinked aggregate derivatives that have the characteristics of debt or liabilities of said preselected entities;  
subtracting the said combined default barrier from said combined at said time horizon; and  
calculating the distance to default at said time horizon, and the expected probability of said combined assets being equal to or less that said combined default barrier at said time horizon, so as to measure risk associated with default or events occurring when said combined assets are less than or equal to said combined default barrier for said preselected entity.

**19. The method of claim 14 further comprising the steps of:**

calculating of the combined asset value by adding said assets to said interlinked aggregate derivatives that have the characteristics of an asset, of said preselected entities;  
calculating of probability distribution of said combined asset value of said preselected entities;  
calculating the combined value of variable default barrier by adding said default barrier to interlinked aggregate derivatives that have the characteristics of debt or liabilities of said preselected entities;  
subtracting the said combined default barrier from said combined at said time horizon; and  
calculating the distance to default at said time horizon, and the expected probability of said combined assets being equal to or less that said combined default barrier at said time

Figure 1 consists of 12 diagrams arranged in two rows of six. Each diagram shows a square vortex core on a grid. The diagrams are labeled with a time step  $t$  and a diagram number. The top row shows the initial state and the first five stages of evolution. The bottom row shows the final stage and the next five stages. The diagrams illustrate the growth and deformation of the vortex core, with labels indicating the time step ( $t$ ) and the corresponding diagram number.

calculating a point, equal to a factor multiplied by the default barrier of the monetary

said point a devaluation of the exchange rate occurs; and

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